

# VIVIAN

# LI

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## Skills & Interests

### Programming & Scripting

Python / R / C++ / Java  
SQL / Bash

### Libraries & Frameworks

numpy / pandas / matplotlib  
scikit-learn / PyTorch / Tensorflow  
ggplot

### Web Development

Javascript / Node / React / Vue  
HTML / CSS / PostgreSQL / PHP

### Other

High-performance Computing

## Education

**University of Colorado Boulder** / August 2023 - present  
Ph.D. student in Computer Science & Interdisciplinary Quantitative Biology  
Advised by Dr. Aaron Clauset (CSCI) & Laura Dee (EBIO)

**Cornell University** / May 2020  
B.A. in Information Science & French, Minor in Computer Science  
Cumulative GPA: 3.88

## Research Statement

I'm interested in predicting ecosystem response to disturbances, such as those driven by climate change or human activity. Using dynamic models and computer simulations, I analyze ecological networks to understand how feeding and non-feeding species interactions shape ecosystem structure and resilience. My work bridges both biology and computation, and I'm committed to interdisciplinary approaches that use tools from computer science to answer ecological questions.

## Graduate Research

### Predicting Ecosystem Recovery Trajectories / 2023 - present

- Simulated ecological disturbances and recovery dynamics using the allometric trophic network model and synthetic ecological networks
- Analyzed how ecosystem structure and feeding/non-feeding interactions influence recovery trajectories

### Identifying Structural Variants in the Human Genome / 2024 - present

- Developed a statistical method to distinguish ambiguous structural variants
- Demonstrated superior model performance on synthetic sequencing data
- Identified hundreds of novel variants using both short- and long-read sequencing data from the 1000 Genomes Project samples

### Modeling Tau Spread Across a Neuronal Network / 2024

- Created a network-based model of the brain to analyze how structural connectivity influences the spread of misfolded tau proteins in neurodegenerative disease
- Simulated the effects of therapeutic interventions to assess their potential to prevent or mitigate disease progression

### Modeling the Evolution of Social Foraging Behavior / 2023

- Built an agent-based model to simulate the evolution of traits linked to social foraging behavior in animal populations

## Work Experience

### Uncountable / March 2020 - March 2022

Full Stack Engineer

- Improved the Uncountable platform through additions and modifications to all pages across the platform, responding to customer asks and improving the code quality and web design of the platform, in React
- Designed numerous API endpoints to add complex functionalities and improve AI tools for user interactions across the platform, in Python and PostgreSQL
- Designed and implemented an inventory management system and a series of visualizations for our AI tools, and managed the platform's project notebook through UI design and code review

### NASA Jet Propulsion Laboratory / June 2019 - August 2019

Frontend & Software Developer Intern, Mars 2020 Mission

- Developed a frontend application to simulate the drive and camera views of the Mars 2020 Rover in a 3D animation upon user input of rover commands, in React
- Simplified the process for users to plan, execute, and verify command sequences in uplink by implementing a live text editor, three.js 3D simulator, and data table into the application
- Worked with various APIs and AWS to run backend computations and deploy the application, and implemented and modified node packages such as react-redux and react-ace

## Publications and Presentations

**Li, V.**, Chowdhury, M., Layer, R. M., & Clauset, A. SVeperator: A Statistical Framework for Resolving Merged Structural Variants. Manuscript in preparation, expected submission May 2025.

**Li, V.**, Li, H., Staller, M., Clauset, A., Barner, A., & Dee, L. Accounting for Non-Trophic Interactions is Key for Predicting Ecosystem Recovery. Talk to be presented at the ESA Annual Meeting, August 2025.